

A NEW SPECIES OF *OREAGRION* (ODONATA:  
COENAGRIONIDAE): MONTANE DAMSELFLIES  
FROM NEW GUINEA

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*Oreagrion pectingi* sp. n. (Coenagrionidae) is described from specimens collected above 3000 m on the slopes of Mt Wilhelm and Mt Capella, Papua New Guinea. The discovery of this new species sheds new light on the relationship of *Oreagrion* with other ischnurines.

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The ischnurine genus *Oreagrion* Ris was originally based on a single female collected at 3000 m in the Snow Mountains (now called the Maoke Range) of central New Guinea (Irian Jaya) (Ris 1913). Thirty years later, from the same general area, Liefstinck (1949) described a further three species collected near Lake Habbema and Mt Wilhelm (now called Mt Trikora) between 3000-3500 m. Since then no further species of the genus have been described, although Liefstinck predicted that others would probably be found residing throughout the sub-alpine highlands of New Guinea. About 700 km to the east of Lake Habbema, in Papua New Guinea, similar tropic-alpine conditions occur on Mt Wilhelm and it was here that a fifth species was discovered by George Beccaloni in August 1990. Subsequently, in November, 1991 one of us (SJR) discovered another population on the southern slopes of Mt Capella, in the Star Mountains, central New Guinea.

At both localities, no other insects were flying on the cool, exposed slopes, so it is of note that this species of damselfly can tolerate such harsh conditions. However, *Oreagrion* species are stout and robust, and the head, thorax, and basal segments of the abdomen have a sparse covering of long, fine hairs which may play a role in thermoregulation. Similar hairs occur in *Protallagma*, a neotropical genus of ischnurines from the high Andes.

Because of the absence of a ventral spine on the 8th abdominal segment in females of *Oreagrion*, Liefstinck (1949) regarded the genus as the primitive progenitor of *Ischnura* which it otherwise resembles. However,

*Oreagrion pectingi* sp. n. does possess a ventral spine which throws into doubt Liefstinck's interpretation of the phylogenetic relationships of the genus.

#### TAXONOMY

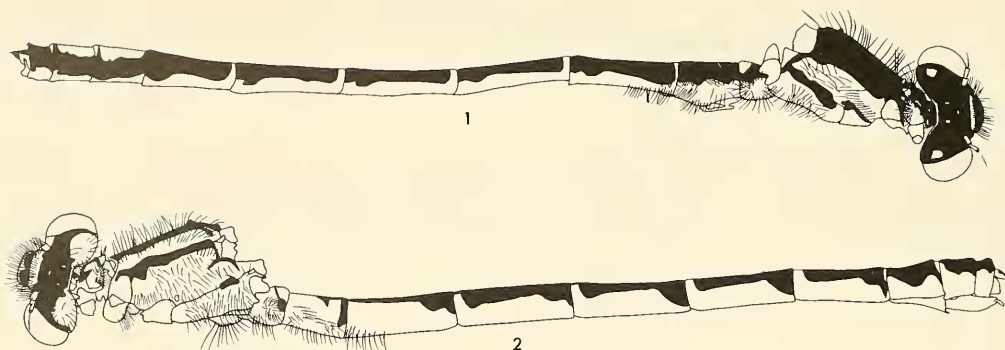
*Oreagrion pectingi* sp. n.  
(figs. 1-8)

Type material. – Holotype ♂: Papua New Guinea, Chimbu Province, Mt. Wilhelm, near waterfall entering west end Lake Piunde, 3600 m, 6 August 1990, G. Beccaloni (BMNH). – Paratypes: 1 ♀, same data as holotype; 2♂ 1♀ (incl. one pair), Papua New Guinea, Star Mountains, southern slopes of Mt Capella, Dokfuma, pond in subalpine meadow, 5°1'S 141°7'E, 3000-3200 m, 16/19 Nov 1991, S. J. Richards (all paratypes in BMNH).

#### Description

Male holotype. Note that the markings described below are based on living specimens; after the death the pale areas become orange-brown.

Head (fig. 1). Width across eyes 4.1 mm. Eyes (in life) dark brown in dorsal half, pale blue ventrally. Labrum blue-green with narrow black basal stripe and black median triangular spot. Base of mandible blue-green. Gena blue-green. Clypeus black. Frons blue-green. Vertex black with small, rounded, pale blue post-ocular spots and narrow, pale blue occipital stripe. Long fine hairs sparse on labrum, clypeus, vertex (especially in post-ocular region), occiput; dense on frons.



Figs. 1-2. *Oreagrion pectingsi* sp. n. – 1, male, right lateral view; 2, female, left lateral view;

Prothorax (fig. 1). Anterior lobe black with small lateral blue-green spot; propleuron blue-green; median lobe black with small lateral blue-green spot; posterior lobe black. Hairs on posterior lobe sparse, dense on posterior margin of propleuron.

Mesostigmal lamina (fig. 3): black medially, peripherally blue-green, with small, rounded submedian tubercles on posterior margin; tubercles black on anterior face, blue-green dorsally and posteriorly.

Pterothorax (fig. 1). Bronze-black on dorsum, pale antehumeral stripe absent; mesepimeron black in dorsal half, blue-green below; metepisternum almost entirely blue-green but with narrow black stripe adjacent to second lateral suture; metepimeron with narrow black stripe adjacent to second lateral suture, the rest blue-green. Fine long hairs covering most of synthorax but absent antero-laterally. Legs: black with narrow blue-green stripe on flexor surface of femora; coxa blue-green. Wings: hyaline with faint amber suffusion. Venation black. Pterostigma (fig. 4) medially dark brown in fore wing, pale brown in hind wing, with narrow yellow-brown border in all wings; 2.5 cells below pterostigma in fore wing, 1.25-1.50 cells in hind wing. Fore wing with 12 postnodals, 10-11 in hind wing. R3 arises between 4th and 5th postnodals in fore wing, 3rd and 4th in hind wing. Measurements. Hind wing 17.5 mm, 4.5 mm at greatest width, pterostigma (fore wing) 0.80-0.84 mm long, 0.5-0.6 mm wide, (hind wing) 0.56-0.62 mm long, 0.36-0.38 mm wide.

Abdomen (fig. 1). S1 with black dorsal spot in anterior half, apple green posteriorly; S2-S7 black dorsally, apple green ventro-laterally; S8-S9 entirely sky-blue dorsally; S10 entirely black dorsally. Fine hairs in ventro-lateral region of S1 and S2, but hairs confined to anterior half of S3. Appendages: superior (figs. 5-6) apple green at extreme base and extero-laterally, black dorsally and interno-laterally; about 3 times as long as inferior, about same length as S10; co-

nical and diverging in dorsal view with broad, recurved median ventral tooth which narrows towards its apex. Hairs short, sparse. Inferior with apex of dorsal branch black, rest apple green; bifurcate with broad, blunt ventral branch and narrow, cylindrical dorsal branch. Total length 30.5 mm, abdomen 24 mm (including appendages 0.58 mm).

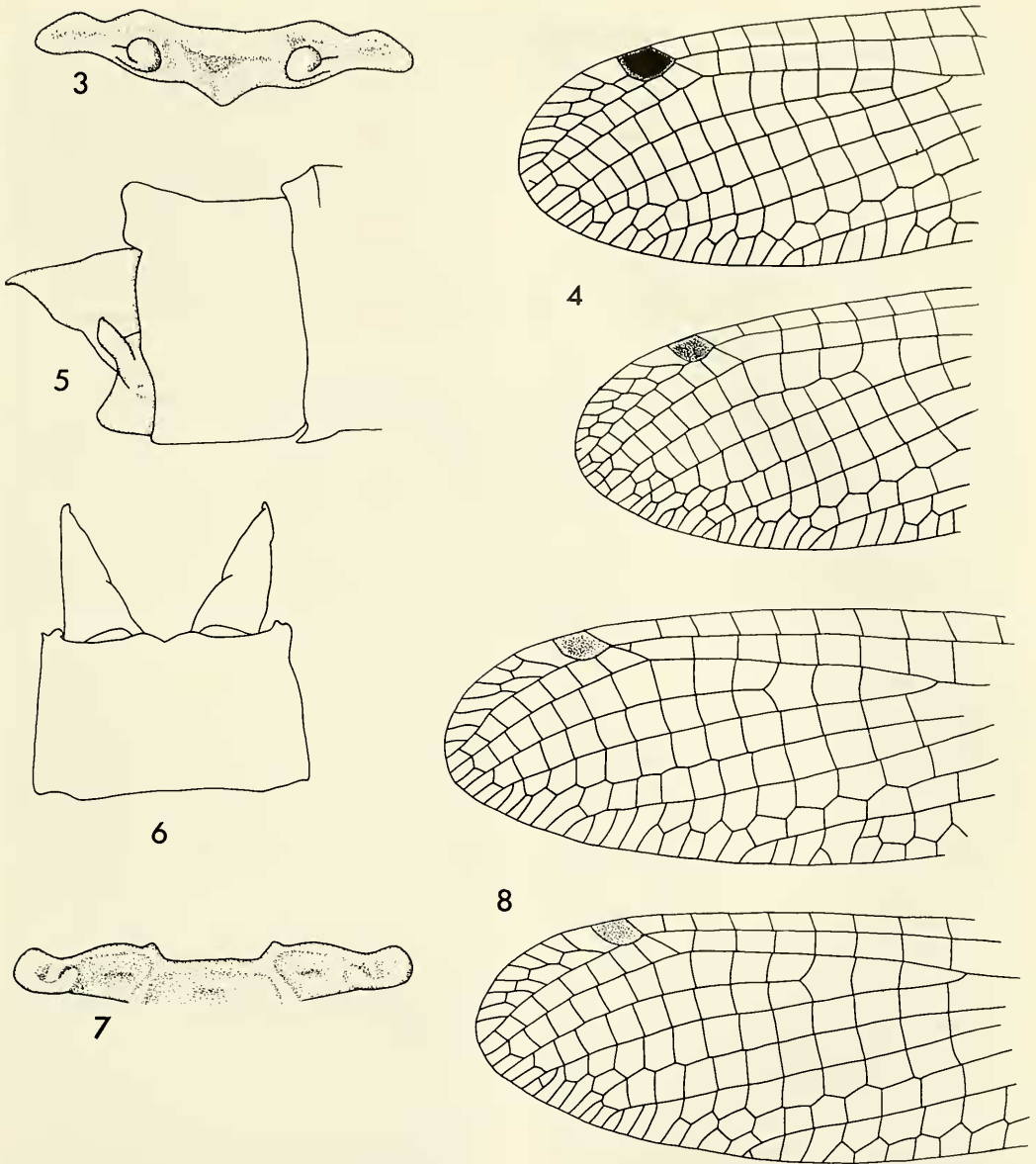
Female paratype. – As male except the following.

Head (fig. 2). Eyes dark brown in dorsal half, apple green ventrally. Labrum apple green with small medio-basal black spot. Base of mandible apple green. Gena apple green. Clypeus black with narrow apple green border. Frons apple green. Vertex black; postocular spots apple green, large and confluent with occipital stripe.

Prothorax (fig. 2). Anterior lobe apple green; propleuron apple green; median lobe black dorsally with large apple green lateral spot; posterior lobe black medially, apple green laterally. Mesostigmal lamina (fig. 7). Black medially with anterior margin and lateral lobes apple green; lateral lobes reniform.

Pterothorax (fig. 2). Bronze-black on dorsum with broad apple green antehumeral stripe; mesepimeron with narrow black stripe adjacent to first lateral suture, the rest apple green; metepisternum apple green with short black stripe near posterior margin; metepimeron apple green with black posterior spot on second lateral suture. Fine, long hairs over most of synthorax but absent from antero-lateral region. Legs: femur and tibia apple green with lateral black stripe on external face; tarsus black. Wings: hyaline with pale amber suffusion. Venation black. Pterostigma (fig. 8) pale brown in fore and hind wing; 1.5 cells below prerostigma. Measurements: hind wing 19.5 mm, 4.0 mm at greatest width; pterostigma 0.72 mm long, 0.32 mm wide in fore wing; 0.62 mm long, 0.32 mm wide in hind wing.

Abdomen (fig. 2). S1 apple green with small black



Figs. 3-8. *Oreagrion pectingi* sp. n. — 3, male mesostigmal lamina, dorsal view; 4, male apex of fore and hind wing; 5, male anal appendages, right lateral view; 6, male superior appendages, dorsal view; 7, female mesostigmal lamina, dorsal view; 8, female apex of fore and hind wings.

lateral spot connected by fine black line to black dorsal spot in anterior half; S2 apple green with small black antero-dorsal spot and black sagittal spot in posterior half; S3-S10 with black dorsal stripe, narrow anteriorly, broadening posteriorly, apple green laterally. S8 with ventral spine. Ovipositor short, ex-

tending 0.2 mm beyond apex of abdomen. Anal appendage (fig. 2) short, conical, blunt apically and slightly downturned. Measurements: total length 30.5 mm, abdominal length 22.5 mm (including anal appendages 0.38 mm).

Habits. – The type locality is a steep east-facing bank, supporting alpine vegetation, about 100 m above Lake Piunde on the slopes of Mt Wilhelm. A full description of the terrain is given by Smith (1982). The lake is oligotrophic and appeared to be devoid of higher plants and invertebrates. During August rain may fall every afternoon but up to 22 consecutive dry days have been recorded. Night temperatures fall below freezing and day temperatures may exceed 20°C. The holotype and paratype were collected over a shallow seepage trickling through grass, low herbage and bare rocks. The seepage was unshaded and exposed to the wind. Several additional zygopterans, probably of the same species, were observed, but not collected, flying in sunshine at the locality. No other odonates were seen. The holotype and paratype were photographed ovipositing in tandem into rotting grass stems in about one cm of water. Both male and female had their legs in contact with emerging grass stems during oviposition.

The locality at Mt Capella is similar in character. The meadow floor is covered with a thick mat of ferns with clumps of large tree-ferns and stunted rhododendrons. The entire meadow is very boggy and with scattered small areas of open water. *O. pectingi* occurred around these pools. The ponds were devoid of vegetation and supported a depauperate fauna. No Odonata larvae were discovered in the ponds. Temperatures in November fell to 1°C at night and got no higher than 15°C during the day. Individuals flew during brief periods of sunshine. They ceased activity during cloudy or rainy weather. At one pond, about 4 m in diameter, five males rigorously defended territories around the perimeter, chasing off intruding males. Two of these males successfully mated at least once during the three days they were observed.

Remarks. – Females of *Oreagrion pectingi* may be distinguished from other members of the genus by the presence of a ventral spine on the 8th abdominal segment. Otherwise *pectingi* has similar markings to *O. oreadum* Liefstinck. However, the lateral lobes of the mesostigmal lamina are rounded in *pectingi* but narrow and taper apically in *oreadum*.

The abdominal markings of the male *pectingi* also most closely resemble male *oreadum* but the pale colouration is yellow rather than blue-green in the latter species. In *oreadum* males there is a broad antehumeral stripe which is absent in *pectingi* and the pterostigma of the fore wing is uniformly brown and lacks the pale apical outer angle of *oreadum*. The anal appendages most readily differentiate *pectingi* from other *Oreagrion* species and are not as densely pubescent. However, they are closest in appearance to *oreadum*. Like this species the superior appendages taper apically but are more acutely pointed in *pectingi*. The large

ventral tooth arises subapically in *pectingi*, but is apical in *oreadum*. The inferior appendages in *oreadum* are narrow, directed posteriorly and are considerably longer than the superiors. The inferiors of *pectingi* are short and bifurcate, although the narrow dorsally directed branch is again remnescent of *oreadum*. Male and female of *O. pectingi* are considerably larger than *oreadum*. The similarities of the characters noted above suggest that *O. pectingi* is most closely related to *O. oreadum*, which Liefstinck (1949) thought was the most primitive of the *Oreagrion* species.

Liefstinck (1949) considered *Oreagrion* to be an ischnurine because the males have dissimilar pterostigmata in the fore and hind wing and because of certain penile characters, synapomorphies that suggest a close relationship with *Ischnura*. However, unlike *Ischnura*, the females of the four *Oreagrion* species known to Liefstinck lacked a ventral spine, which implied that they were less derived than *Ischnura*. Nevertheless, in *O. pectingi*, a fully developed ventral spine is present. If Liefstinck's assertion is correct, and *Oreagrion* is a primitive ischnurine, then the ventral spine must have arisen independently once in *O. pectingi* and again in the *Ischnura*-related ischnurines. Another interpretation of the phylogeny of *Oreagrion* is that the ventral spine has been secondarily lost in the other four species of *Oreagrion*, but plesiomorphically retained in *O. pectingi*. This would imply that, rather than being a stem-group ischnurine, *Oreagrion* is more closely related to *Ischnura* than Liefstinck suggested. However, until more species of *Oreagrion* are discovered and more work is done on ischnurine phylogeny this problem will be difficult to resolve.

#### ACKNOWLEDGEMENT

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